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Citation	大阪大学歯学雑誌. 65(2) p.61-p.66
Issue Date	2021-06-30
oaire:version	VoR
URL	<a href="https://hdl.handle.net/11094/84543">https://hdl.handle.net/11094/84543</a>
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# Incidental finding of an abdominal aortic aneurysm detected on the unenhanced CT portion of FDG-PET/CT for preoperative screening in a patient with oral squamous cell carcinoma

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(令和3年1月7日受付)

## ABSTRACT

**Aim:** In patients with oral cancer, the head and neck and lung fields are often evaluated by several imaging examinations. Among the imaging examinations other than fluorodeoxyglucose positron emission tomography/computed tomography (FDG-PET/CT), whole-body evaluation, including the lower abdomen and below is rarely performed routinely as a preoperative examination for oral cancer. However, a patient with oral cancer may also have potentially an abdominal disease, and early detection is required particularly in a fatal disease. This report discusses the importance of FDG-PET/CT for preoperative whole-body screening and the pitfalls of preoperative evaluation for oral cancer.

**Case presentation:** This article describes a 65-year-old man with an incidentally-detected abdominal aortic aneurysm at a site remote from the head and neck, on preoperative examination using FDG-PET/CT for oral squamous cell carcinoma. An abdominal aortic aneurysm was detected incidentally on the unenhanced CT portion of the FDG-PET/CT. FDG did not accumulate in the abdominal aortic aneurysm; the abdominal aortic aneurysm was detected only on the unenhanced

CT portion. Perioperative blood pressure was carefully controlled, and 2 weeks after the oral surgery, cardiovascular surgeons performed endovascular stent grafting for the abdominal aortic aneurysm.

**Conclusions:** With FDG-PET/CT examination results, it is important to properly confirm not only FDG accumulation but also the unenhanced CT portion, and it is necessary to consider the possibility that a fatal abdominal disease may be detected by a whole-body evaluation for oral cancer.

## 1. Introduction

<sup>18</sup>F-fluorodeoxyglucose positron emission tomography/computed tomography (FDG-PET/CT) is a valuable imaging examination for diagnosis, staging, and treatment in all areas of clinical oncology, including oral cancer, and head and neck cancer<sup>1), 2)</sup>. FDG-PET/CT permits evaluating the entire body as well as the local region of the primary tumor<sup>3)</sup>. This article describes a case of oral squamous cell carcinoma (OSCC) in a 65-year-old man with an incidentally-detected abdominal aortic aneurysm (AAA) on the unenhanced CT portion of FDG-PET/CT imaging.

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## 2. Case presentation

A 65-year-old man was referred to our outpatient office for further evaluation of a mass on the oral floor. He had a medical history of hypertension, and was taking antihypertensive medications (candesartan cilexetil and amlodipine besilate) orally. He had smoked approximately 1–2 packs of cigarettes per day for over 40 years. The first clinical examination revealed a white mucosal lesion with induration measuring  $5 \times 5$  mm on the left oral floor (Figure 1).

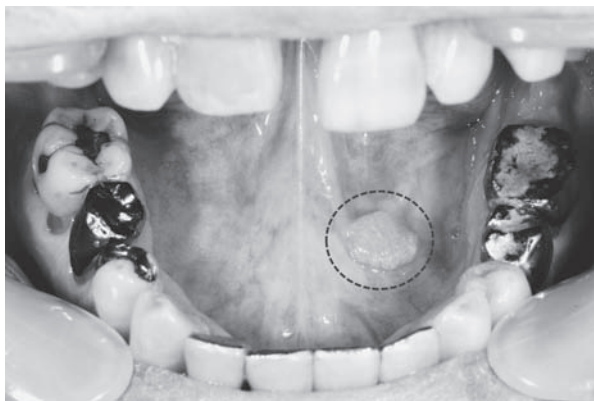


Figure 1 Clinical presentation, intraoral view (published with the patient's consent).

The histopathological diagnosis of OSCC was made by biopsy. We performed imaging evaluations for the primary lesion and for the lung fields, as the most frequent sites of distant metastasis of OSCC. We performed plain chest radiography, contrast-enhanced CT (CECT), magnetic resonance imaging (MRI), and FDG-PET/CT. The imaging range of the CECT was from the head and neck to the upper lung fields, and MRI was limited to the head and neck. The primary lesion was so small that it was only slightly visible on MRI (Figure 2), and not at all visible on CECT or FDG-PET/CT. Plain chest radiography showed no evidence of an aneurysm (Figure 3), and there was no finding suggesting distant metastases (Figure 4). However, an AAA was detected incidentally on the unenhanced CT portion of the FDG-PET/CT (axial plane only). The AAA measured  $50 \times 38$  mm (Figure 5), and FDG did not accumulate in the AAA (Figure 6). We consulted a cardiovascular surgeon and planned to treat the AAA after the OSCC surgery. Because of the clinical diagnosis of stage 1 OSCC (cT1N0M0), tumor resection was performed under general anesthesia (Figure 7). Perioperative blood pressure was carefully controlled to not exceed 110

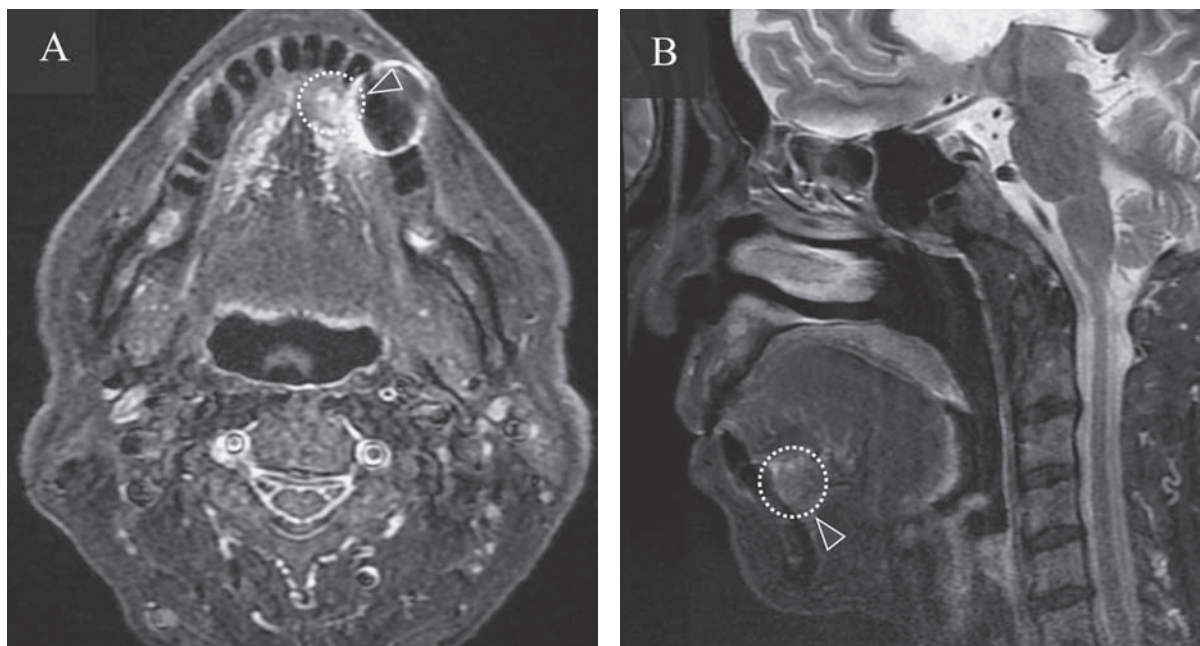


Figure 2 Magnetic resonance image (short TI inversion recovery) showing a contrast-enhanced lesion. (A) Axial plane. (B) Sagittal plane.



Figure 3 Plain chest radiograph showing no evidence of an aneurysm.



Figure 4 <sup>18</sup>F-fluorodeoxyglucose positron emission tomography image showing no findings suggesting distant metastases.



Figure 5 An abdominal aortic aneurysm detected on the unenhanced computed tomography portion of <sup>18</sup>F-fluorodeoxyglucose positron emission tomography.

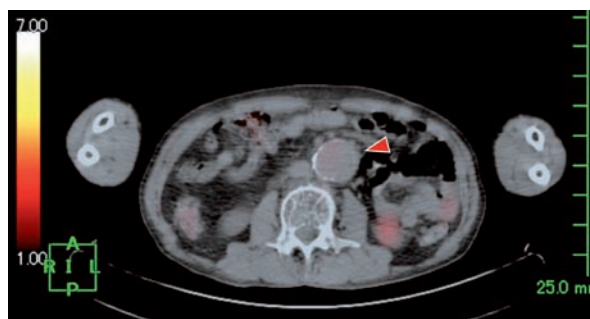


Figure 6 <sup>18</sup>F-fluorodeoxyglucose did not accumulate in the abdominal aortic aneurysm.

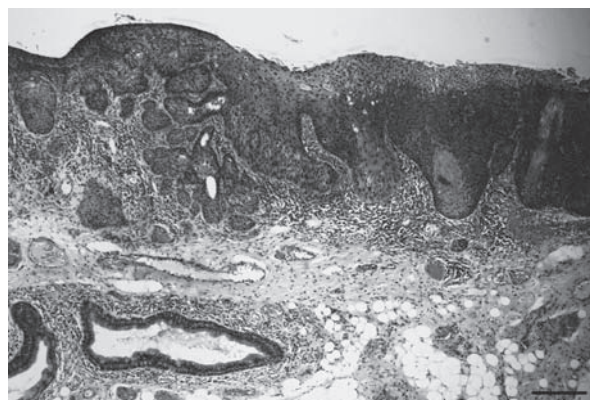


Figure 7 The histological features of the squamous cell carcinoma. (Hematoxylin and eosin staining,  $\times 20$ ; scale bar, 100  $\mu\text{m}$ ).



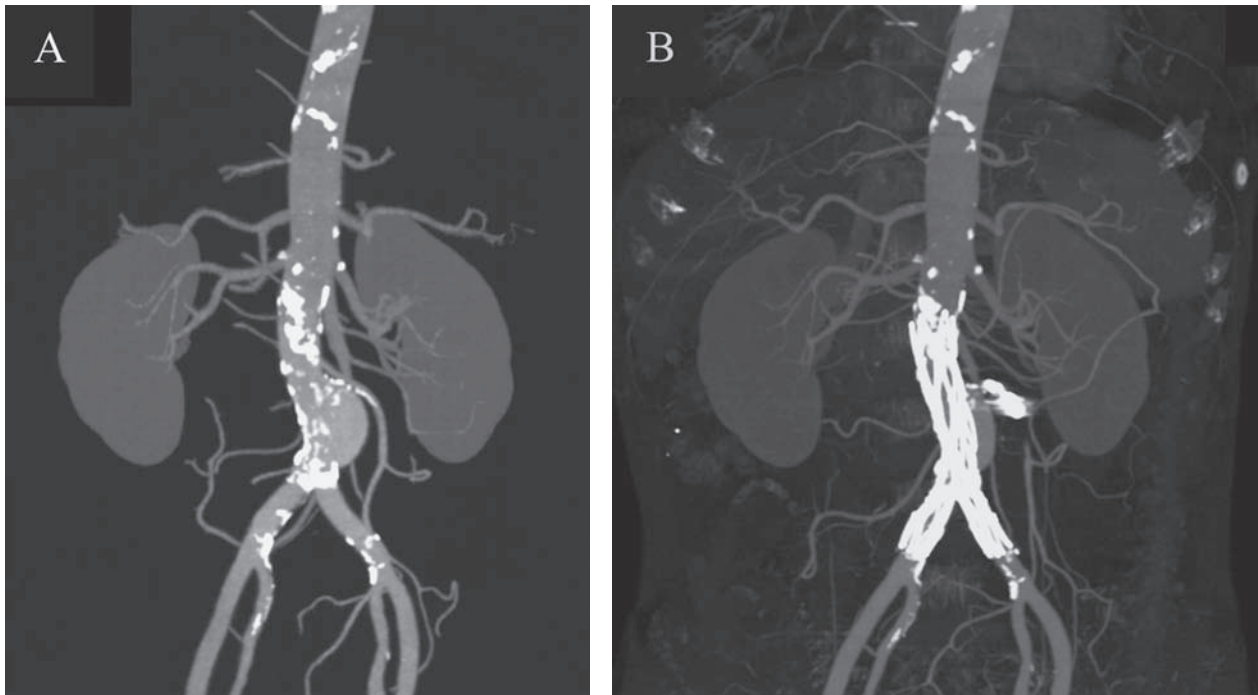


Figure 8 Computed tomography angiography of the aorta. (A) Before the operation. (B) After endovascular stent grafting.



Figure 9 Intraoral examination 6 months after the surgery.

mmHg, and 2 weeks after the oral surgery, cardiovascular surgeons performed endovascular stent grafting for the AAA (Figure 8). The patient's postoperative course was uneventful (Figure 9), and there was no evidence of complications.

### 3. Discussion

Most AAAs are asymptomatic, and are often detected as an incidental finding in imaging evaluations for other purposes<sup>4), 5)</sup>. The main examinations that detect an AAA are abdominal ultrasonography, abdominal CT, and MRI performed for other abdominal diseases occurring in the same area as the AAA<sup>6), 7)</sup>. However, in head and neck cancer, which is a disease that occurs in a region completely apart from an AAA, it is difficult to detect an AAA by routine preoperative imaging examinations other than FDG-PET/CT.

Because of staging of malignancies, which is one of the roles of FDG-PET/CT, a whole-body evaluation is usually performed. Therefore, FDG-PET/CT may detect another disease incidentally that requires additional inspection in other areas<sup>8)-11)</sup>. According to previous studies, lung diseases such as pulmonary nodules, pleural effusion, and pneumothorax are often detected<sup>8), 9)</sup>. The main diseases for which FDG-PET/CT is used to detect other diseases are malignant lymphoma and lung cancer, and the frequency of its use in head and neck cancer is low<sup>10), 11)</sup>.

Recently, it has been suggested that FDG-PET/CT could be valuable for evaluating aortic diseases such as aortic aneurysm, acute thoracic aortic syndromes, atherosclerotic lesions, aortitis, and aortic malignancies<sup>12)-16)</sup>. Regarding aortic aneurysm, FDG accumulation in an AAA may predict expansion and progression in symptomatic patients; however, in asymptomatic patients, FDG-PET/CT results vary widely and are inconsistent<sup>17)-20)</sup>. In our patient, the AAA was asymptomatic and accumulated no FDG; the AAA was detected only on the unenhanced CT portion. With FDG-PET/CT examination results, it is important to properly confirm not only FDG accumulation but also the unenhanced CT portion.

The United States Preventive Services Task Force recommends that men between the age of 65 and 75 years who have ever smoked should be screened at least once for AAAs by abdominal ultrasonography<sup>21)</sup>. However, in patients with oral cancer, it is difficult to perform preoperative abdominal ultrasonography for all target patients. In our patient, the tumor was small; however, surgery under general anesthesia was planned after the diagnosis from the partial biopsy, and as a result, AAA was detected on preoperative screening. Considering that whole-body evaluation is not possible with routine imaging examinations for oral cancer other than with FDG-PET/CT, in the case of target patients, performing FDG-PET/CT may be recommended, even for early-stage cancer. Furthermore, it is necessary to consider the possibility that a fatal abdominal disease may be detected by a whole-body evaluation for oral cancer, and to obtain informed consent before imaging.

#### 4. Conclusion

With FDG-PET/CT examination results, it is important to properly confirm not only FDG accumulation but also the unenhanced CT portion, and it is necessary to consider the possibility that a fatal abdominal disease may be detected by a whole-body evaluation for oral cancer. Identifying any incidental finding is crucial to provide appropriate care for the cancer patient and achieve a better outcome.

#### Acknowledgments

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. The author thanks Jane Charbonneau, DVM, from Edanz Group ([www.edanzediting.com/ac](http://www.edanzediting.com/ac)) for editing a draft of this manuscript.

#### Conflict of Interest

The author declares that there is no conflict of interest.

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